D0 Data Settings Test Page
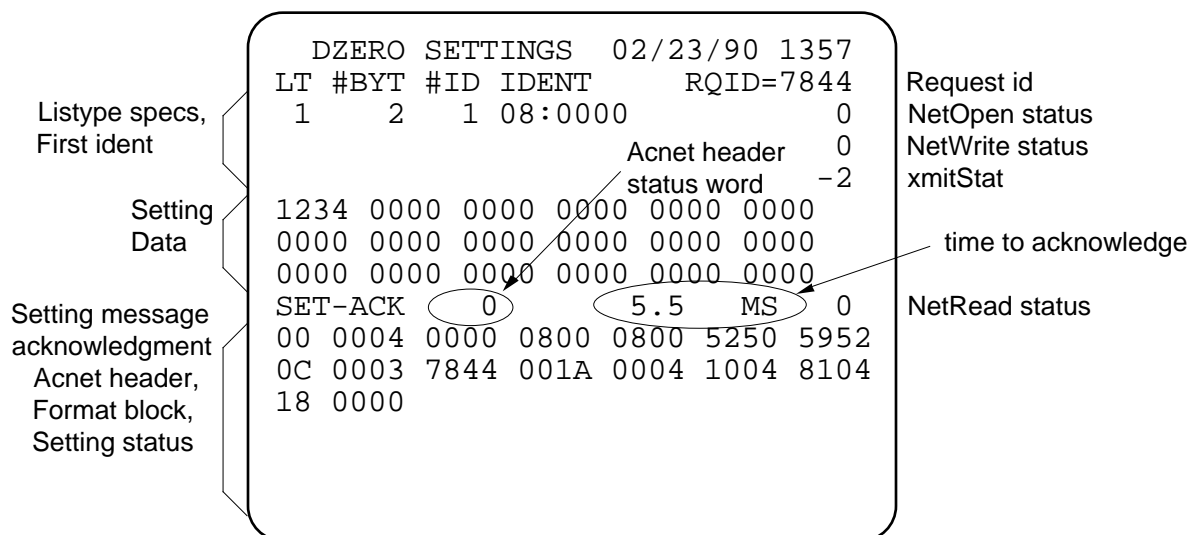*Local Station Application*
Feb 23, 1990

Introduction

A new protocol for data setting network messages was designed for use with the D0 detector's CDAQ (Controls Data Acquisition) software. The VME local stations support this message format for data settings. This application page exercises the new protocol by issuing data setting messages to a local station and displaying the response that is returned. It is written using the local station's Network Layer interface routines. This document and test program itself borrows heavily on the document entitled "D0 Data Requests Test Page."

Display page layout

```
    DZERO  SETTINGS   02/23/90 1357
  LT #BYT #ID IDENT       RQID=7844      Request id
   1    2   1 08:0000            0       NetOpen status
                                  0      NetWrite status
                Acnet header
                status word      -2      xmitStat
  1234 0000 0000 0000 0000 0000
  0000 0000 0000 0000 0000 0000           time to acknowledge
  0000 0000 0000 0000 0000 0000
  SET-ACK    0          5.5   MS   0     NetRead status
  00 0004 0000 0800 0800 5250 5952
  0C 0003 7844 001A 0004 1004 8104
  18 0000
```

Left labels: Listype specs, First ident / Setting Data / Setting message acknowledgment Acnet header, Format block, Setting status

This snapshot of the test program display shows an example of sending a 2-byte data word setting value of $1234 to channel 0 in node 08.

Parameter entry

The `RQID` is the request id that serves to uniquely identify the setting acknowledgment with the setting message that was issued.

Enter up to three listype specifications each with an associated starting ident. The listype#, the #dataBytes/ident, and the #idents are specified in decimal. Enter the starting ident in hex. The ident length is determined by number of digits typed. When the #idents > 1, the additional idents are added sequentially using a step size of 1. (For memory addresses, the step size is 2.) To omit a listype spec, blank out the listype# field.

The setting data is entered in the three line field that allows for up to 36 bytes.

amount of the data needed is determined by the listype specs. (To send only one byte, remember that the byte order is strictly left-to-right in 68K systems.)

Interrupt anywhere in the parameter specification area of the screen (on rows 2–8) to initiate the data setting. The word `SET-ACK` in the response area of the screen is hi-lited to indicate the setting is active. (If the response time is quick enough, it may not be hi-lited long enough to be seen on the 60 Hz refresh display screen.) When the response is received, the elapsed time is displayed on the `SET-ACK` line in milliseconds. This time is measured from just *before* the call to `NetWrite` until just *after* the call to `NetRead` that returns the response.

The Acnet header status word is shown to the left of the elapsed time in decimal just after the word `SET-ACK`. This is done for convenience in interpreting the Acnet header error status codes, which tend to be negative numbers.

Other status replies that are shown are toward the right end of the screen. The status return from NetOpen, which is called upon entry to the page, is given at the end of the third line. Below that is the return from the call to NetWrite when the request message was issued. Below that is the transmit status word that gives the success of the network transmission. At the end of the `SET-ACK` line is the status return from the call to NetRead which returns the acknowledgment.

An interrupt on the `SET-ACK` line merely turns off the hi-liting.

Response data viewing

Six lines are used to display answer data in hex with 6 words per line. The byte value at the left shows the offset in bytes of the first word on the line. There are two ways to adjust the starting offset for the block of answers. (This feature was borrowed from the data request test page and is overkill for the short setting acknowledgments.)

To adjust the offset so that the first word is one of the displayed data words, merely interrupt under the word you want to be the starting word displayed. Obviously, you can only move ahead in this way. The other way to adjust the offset is by typing in the desired offset in the first characters of the first line of answer data and interrupting.

The entire response message is displayed, beginning with the 9-word Acnet header. This is followed by the 2-word format block, beginning with the size word of that block. That is followed by the 2-word acknowledgment message whose second word is the status code.

For cases in which an error is detected before actually invoking the setting

Details of the example setting response

   The first 9 words are the Acnet header. The first word shows that it is a reply message. The next word is the reply status word, and it is also shown in decimal on the line above. The destination and source bode of the request are both node 08 in this case. This example illustrates use of the network to make a setting to itself. (If it didn't do that, it would always require two nodes to do the test.) A by-product of this is that the xmitStat value shown at the end of the fifth line shows the value -2, indicating "address not recognized," which in the case of sending a message to the same node is normal.

The next two words of the Acnet header are the destination task name, which for D0 data requests/settings is `RPYR`. The source task id is 3, which denotes the table index in the Network Connect Table returned by the call to `NetOpen`. The request id is followed by the message size word, which is the total size of the entire response message including the Acnet header itself.

The format block length of 4 bytes (including the length word) shows a single format spec which describes the format of the response message header word and the response status word as two 16-bit integers.

The header is the `8104` word. The status word is zero, indicating no error. The nonzero status values currently range from 1–55 decimal. All other errors are detected during request initialization and return error responses as status-only replies, consisting of only the Acnet header.

The time response value for this example shows 5.5 msec, which is typical for setting acknowledgments when the target node is not busy at the time the setting message arrives.